Development of Python based Statistical Process Control Software

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What is SPC?

- A Statistical Process Control(SPC), is technique which involves comparing the output of the process or a service with a standard and taking remedial actions in case discrepancy between the two.

- A process quality is a **true measure** of ability of process to produce quality product.

- The **measurement of this quality** is proper function of **Quality Control and SPC**.

SPC – Why & Where

- To maintain the quality of the product as well as the manufacturing process.

- Almost everywhere…
- I work with development of SPC for Automotive gauge check Industry.

Computerized SPC

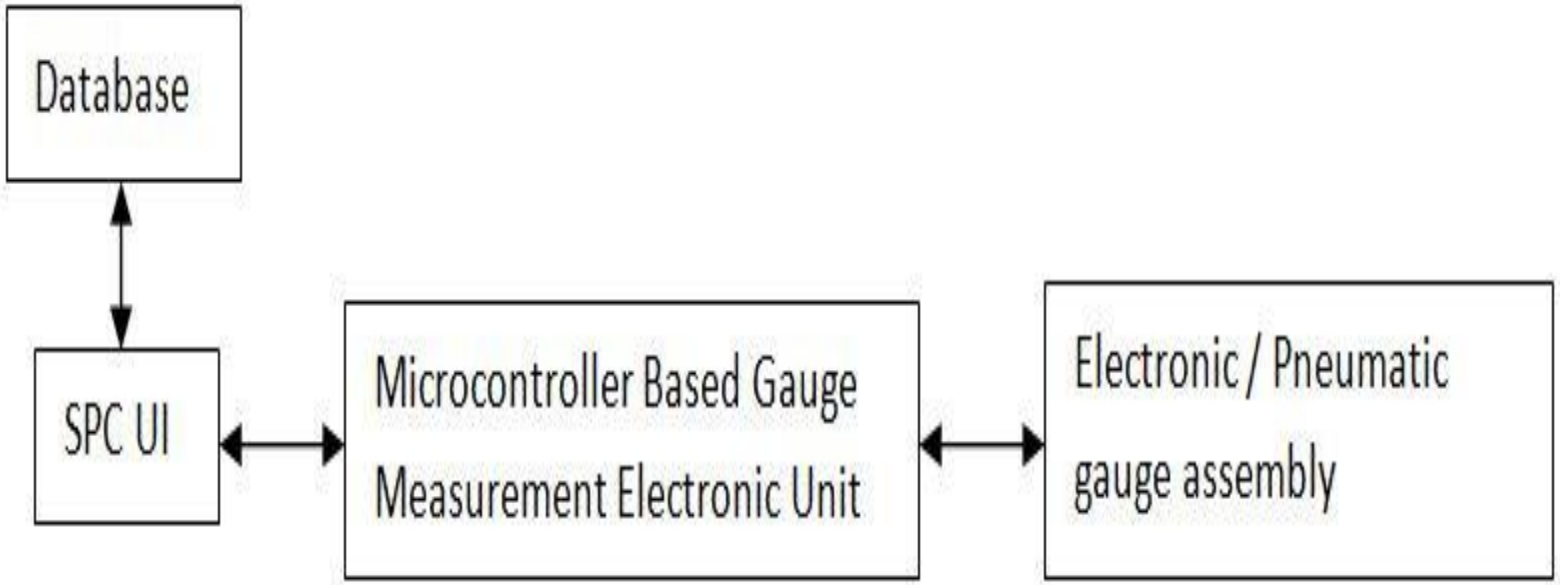
- Benefits –
  - Error Free Calculations
  - Data Storage
  - Widespread Data Access
  - Faster Computation
  - Timed data Collection

- Investments
  - Planning Time
  - Training
  - Cultural Change
  - Hardware Purchase
  - Software Purchase

Checklist of Computerized SPC

- Capability Studies
- Appropriate Charts
- Logs Assignable Causes
- Logs Corrective Actions
- Speed of Execution
- User Friendly
- Help Screens
- Support

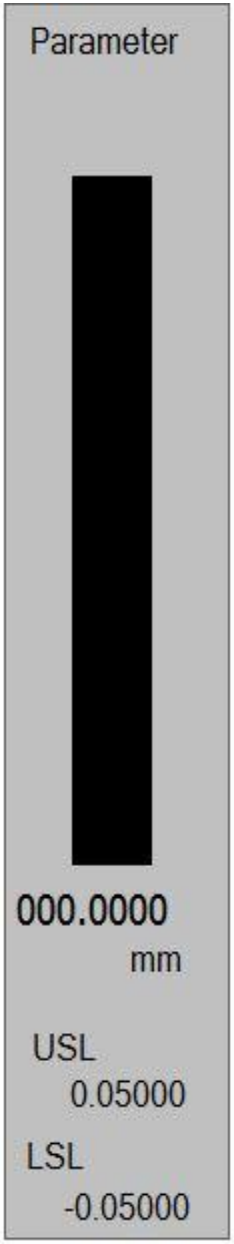
BLOCK DIAGRAM



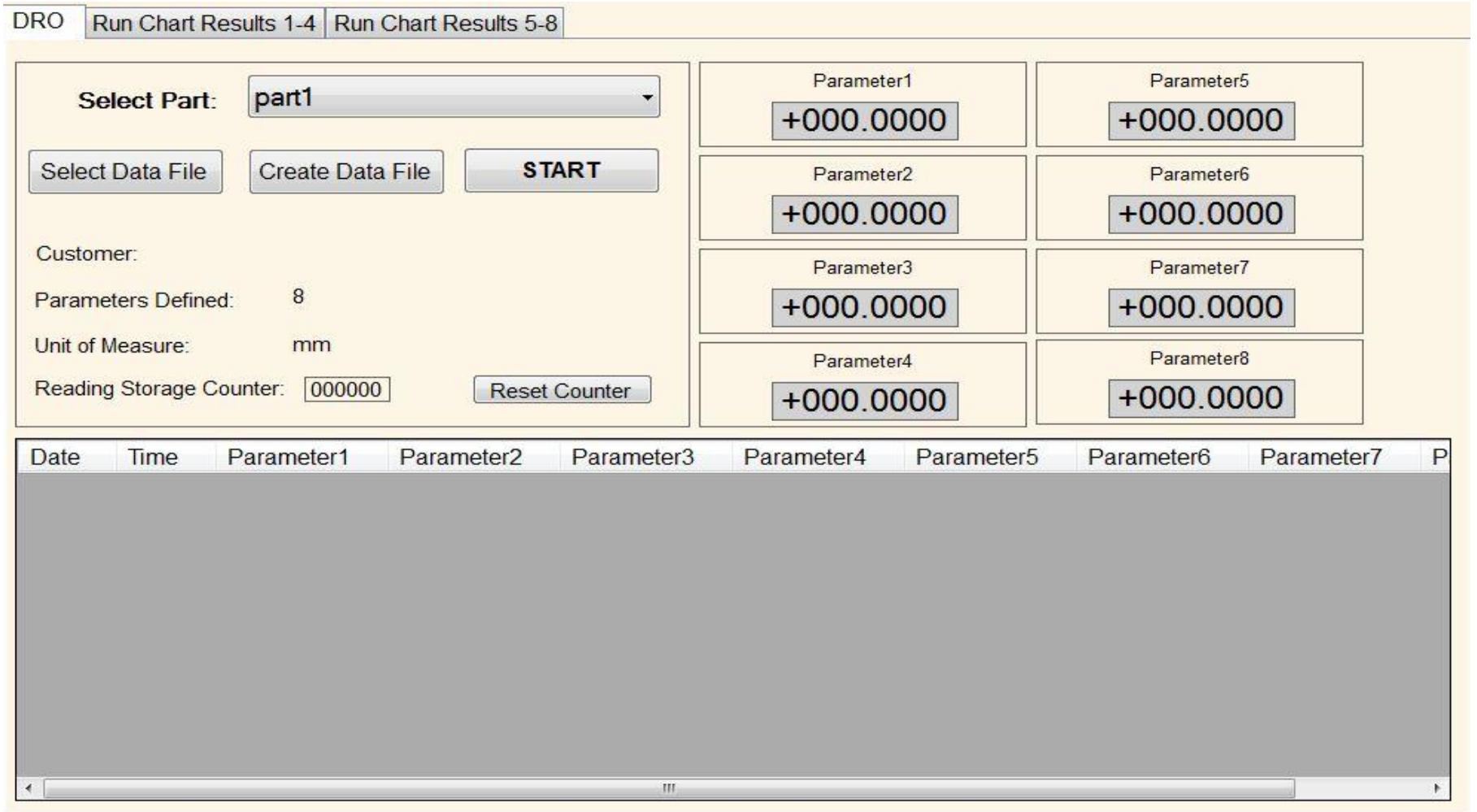
CONTROL CHARTS

- To Control the Quality we use Control Charts
- Always visual inspection is good… Really Good
- There are control limits
  - Control Limits
  - Specification Limits

Some ScreenShots



Few More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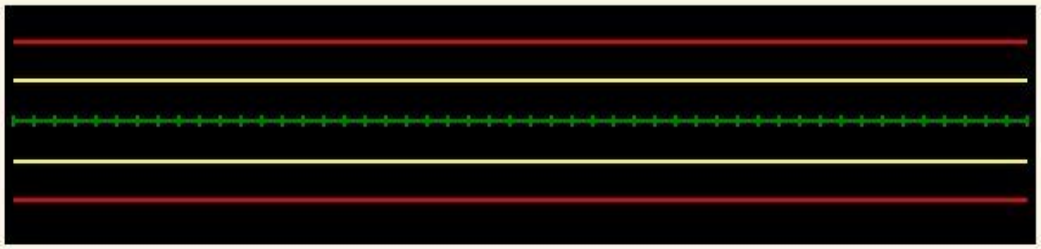
Run Chart Results 1-4
Run Chart Results 5-8
Select Part:
part1
Select Data File
Create Data File
START
Customer:
Parameters Defined:
8
Unit of Measure:
mm
Reading Storage Counter:
000000
Reset Counter
Parameter1
+000.0000
Parameter2
+000.0000
Parameter3
+000.0000
Parameter4
+000.0000
Parameter5
+000.0000
Parameter6
+000.0000
Parameter7
+000.0000
Parameter8
+000.0000
Date
Time
Parameter1
Parameter2
Parameter3
Parameter4
Parameter5
Parameter6
Parameter7
P

DRO | Run Chart Results 1-4 | Run Chart Results 5-8

Parameter1

+000.0000



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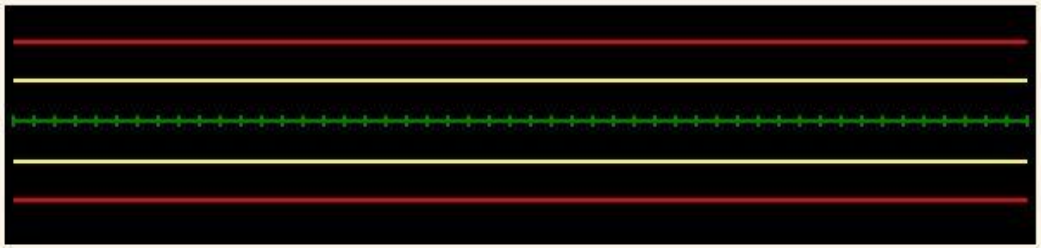
NOM	0.00000
LCL	-0.02500
LSL	-0.05000

Parameter2

+000.0000



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Parameter3

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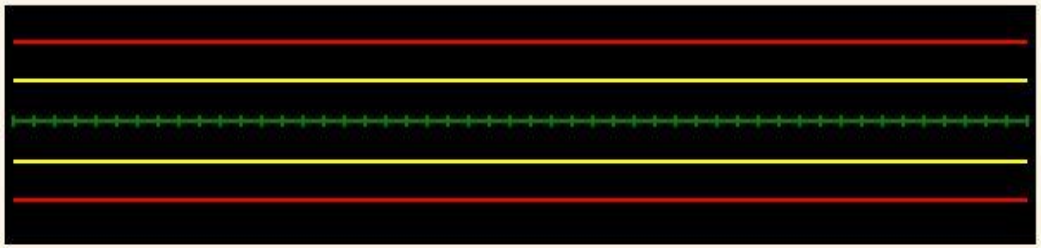

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Parameter4

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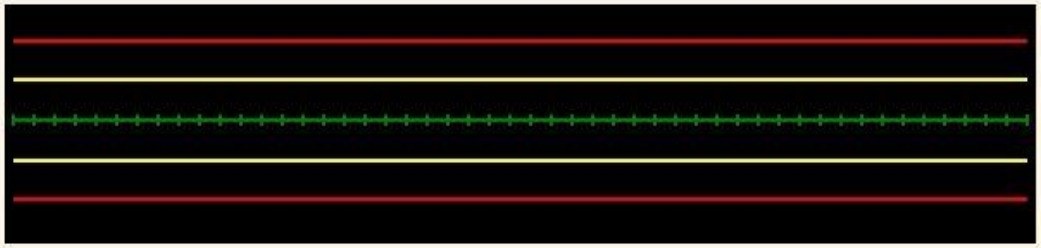


USL	0.05000
UCL	0.02500
NOM	0.00000
LCL	-0.02500
LSL	-0.05000

System I work with

- Everything is developed using
  - Visual Basic
  - .NET 2.0
  - MS-Access 2000

- COST is a BIG problem.

- Current System :
  - VB.NET + Visual Studio + MS-OFFICE
  - WIN CE 6.0

- Problems I faced :
  - Cost + Cost + Cost = More Cost
  - Not affordable for Small Scale Industries
  - Setting up development platform is a difficult task
  - Code traceability

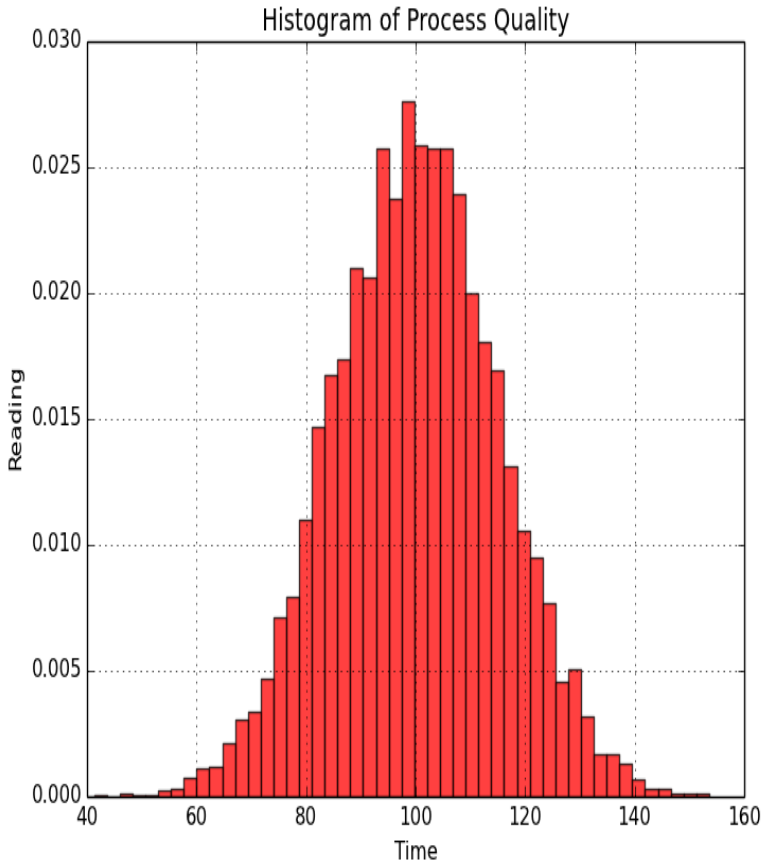
What if I am able to design a SPC using Open Source Tools ?

What Next ?

- No idea as what tool to be used…
- Thought about it only 15 days ago when I actually submit the abstract…
- Searched on web… Found “matplotlib”
- But, don’t know how to use it…

From Last two days

Histogram



- Not to scale
- Not dynamic, only some predefined values

What next?

- Next task is to make it work with microcontroller… more dynamically

- Implement **Graphics** ?

Suggestions…!!!
Your Views!!!
Any other tools…